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11-16-06  
Date

Joanne Bourguignon  
Joanne Bourguignon

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Srinka Ghosh  
Application No. : 10/798,538  
Filed : March 11, 2004  
For : METHOD AND SYSTEM FOR MICROARRAY GRADIENT  
DETECTION AND CHARACTERIZATION  
Examiner : Lori A. Clow  
Art Unit : 1631  
Docket No. : 10030803-1  
Date : November 16, 2006

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ALEXANDRIA, VA 22313-1450

RESPONSE TO RESTRICTION REQUIREMENT

Sir:

In response to the Restriction Requirement dated October 16, 2006, Applicant hereby elects, with traverse, Group IV claims for examination at this time.

According to MPEP § 803:

If the search and examination of an entire application can be made without serious burden, the examiner must examine it on the merits, even though it includes claims to independent or distinct inventions. (emphasis added)

As further stated the MPEP § 803:

There are two criteria for a proper requirement for restriction between patentably distinct inventions:

- (A) The inventions must be independent; and
- (B) There must be a serious burden on the examiner if restriction is required. (references to other MPEP sections omitted)

Therefore, it is clear from the MPEP that, in general, even when an application includes distinct inventions, unless examination of the entire application represents a serious burden,

the examination should be made without restriction. It should also be noted that, in general, claims directed to methods and systems incorporating those methods are quite commonly examined together in computer-science-related and electronics-related applications, and method claims and dependent claims to the method claims for stored representations of the methods are almost always examined together.

As pointed out by the Examiner in the Restriction Requirement, claims 1-10 are directed to a method for detecting a background intensity gradient within a microarray data set, while dependent claim 11 is directed to a computer program that implements the method. In other words, claim 11 is directed to exactly the method steps and subject matter to which claim 1 is directed. In view of MPEP § 803, Applicant can see no reasonable justification for restricting claim 11 from claim 1. In fact, separately searching for essentially identical subject matter would quite reasonably be expected to represent a far great burden than searching for the subject matter a single time. Because this method can only be practically carried out by an automated system, a search for the method will invariably constitute a search for an automated system that carries out the claimed method.

Claims 12 reads as follows:

12. A method for characterizing background intensity gradients within a microarray data set, the method comprising:
  - computing metrics for features within the microarray data set; and
  - when the metrics computed for a number of features are larger than a threshold value,
    - grouping features with computed metrics by position; and
    - characterizing a background intensity gradient corresponding to each group of features by an area of the microarray surface corresponding to the group and by a position of the group on the surface of the microarray.

Claim 19 reads as follows:

20. A microarray data set analysis system comprising:
  - a stored image of a microarray; and
  - a processing entity that
    - computes a metric for features within the image of the microarray; and
    - when the metrics computed for a number of features are larger than a threshold value,
      - determines that a background intensity gradient is present in the image of the microarray;
      - groups features with computed metrics larger than a threshold value by position; and
      - characterizes a background intensity gradient corresponding to each group of features.

As can be seen by comparing the language of claims 12 and 20, claim 20 is directed to a system that practices the method to which claim 12 is directed. A search for the method to which claim 12 is directed would necessarily involve searching for automated systems that carry out the method, because the method can only practically be carried out in an automated fashion. In view of MPEP § 803, Applicant can see no reasonable justification for restricting claims 12-18 from claims 19-25. In fact, separately searching for essentially identical subject matter would quite reasonably be expected to represent a far greater burden than searching for the subject matter a single time.

Claims 1 and 12 are both directed to methods for detecting a background intensity gradient within a microarray data set. Claims 1 and 12 differ in that claim 12 includes the language:

grouping features with computed metrics by position; and  
characterizing a background intensity gradient corresponding to each group of features by an area of the microarray surface corresponding to the group and by a position of the group on the surface of the microarray

rather than the language of claim 1:

determining that the microarray data set exhibits a background intensity gradient.

In other words, claim 12 provides greater detail than claim 1 with regarding determining a background intensity gradient. Claim 12 can therefore be considered to be directed to a subset of the methods to which claim 1 is directed. In view of MPEP § 803, Applicant can see no reasonable justification for restricting claims 12-18 from claims 19-25. In fact, separately searching for a subset of a subject and the subject could reasonably be expected to represent a far greater burden than searching for the subject and subsets of the subject in a single search. A search for claim 1 necessarily includes a search for claim 12.

In the Restriction Requirement, the Examiner states that "method claims of instant Groups I and III can be practiced by a method other than the computer apparatus of Groups II and IV. For instance, the methods may be implemented by hand." However, both claims 1 and 12 recite the step of: "computing metrics for features within the microarray data set." Because a typical microarray contains many thousands or tens of thousands of features, and because the metrics explicitly disclosed in the current application involve, for example, mean and median pixel intensities, with the image of a single feature comprising potentially many pixels, it is quite clear that these methods cannot practically be carried out by hand. One could similarly claim that protein crystal structures can be carried out by hand - but - in

fact - because of the number of individual calculations and computations, because of the high error rates associated with hand calculation, because of the time required for the many calculations, and because of the high cost in salaries for trained human calculators, hand calculation is simply not feasible. One could similarly argue that mountains can be moved by a brigade of workers equipped only with shovels - but - in fact - because of time, economic, and practical considerations, they cannot. There is no justification for this statement.

In summary, the current application is directed to methods and systems for detecting background intensity gradients within microarray data sets. The groups into which the Examiner has partitioned the current claims are highly interrelated, and a search for the subject matter to which any one of these groups is directed would necessarily include searching for the subject matter to which the other groups are directed.

Respectfully submitted,

Srinka Ghosh

*OLYMPIC PATENT WORKS PLLC*



Robert W. Bergstrom

Registration No. 39,906

Enclosure:

Postcards(2)

Olympic Patent Works <sup>PLLC</sup>  
P.O. Box 4277  
Seattle, WA 98194-0277  
206.621.1933 telephone  
206.621.5302 fax